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Interagency Ecological Program--1998 Status and Trends Report

• The Year in Review--Notes for Managers

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This is the annual status and trends issue of the IEP Newsletter. I ask agency and university staff to prepare short articles on important components of the San Francisco Bay, Sacramento-San Joaquin Delta, and Central Valley system. As you will find, the important area of contaminants and their effects is not covered in this status review. I will be expanding the contact list for contaminant-related articles in the coming months.

Below I have given a few general comments and observations on material contained in this issue. Overall, most of the fish species of special concern fared reasonably well in 1998. However, there are exceptions, such as Pacific herring and striped bass, even the fall striped bass juvenile abundance was up a little over the past few years.

Flow and Pumping

1979.

Whereas young-of-the-year striped bass have declined due to the impacts of water diversions in the delta, American shad are increasing. This may be due in part to their use of nursery areas upstream of the delta where they are not affected by export pumping at early life stages. Although the decline in adult striped bass is removing a potential predator, Stevens (1966) did not identify American shad as a major food source of striped bass. Two hypothesis are worth investigating: (1) increases in the adult stock have lead to greater egg production and (2) the survival of the young has increased due to changes in the environment or the zooplankton community.

In 1998, American shad were found from the delta to San Pablo Bay but the highest concentrations shifted with time as the population migrated downstream (see Table 2). In September and October, the main concentrations of American shad were in the lower Sacramento and San Joaquin rivers and the delta. However, in November and December, the distribution shifted into Suisun Bay, the Carquinez Strait, and San Pablo Bay. The pattern of distribution and movement was roughly the same as in 1997 (Foss and Miller 1998b).

It is likely that the December American shad index was underestimated, but with a small effect on the fall index (see above). In November, 84% of the index had shifted west and out of the delta (see Table 2). Also, most American shad (85%) were caught in September and October with the monthly index dropping rapidly from 2,093 in October to 515 in November and finally to 214 in December.

More information about young-of-the-year striped bass and American shad may be viewed on the Internet at <http://www.delta.dfg.ca.gov/data/mwt98/>.

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Stevens DE. 1966. Food habits of striped bass (*Roccus saxatilis*) in the Sacramento-San Joaquin Delta. In: Turner JL and DW Kelly, compilers. Ecological Studies of the Sacramento-San Joaquin Delta, Part II Fishes of the Delta. California Department of Fish and Game Bulletin 136. p 68-96.

Fish Salvage at the SWP and CVP Facilities

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In 1998, monthly water exports at the State Water Project (SWP) ranged from a low of 1,839 acre-feet (af) in April to a high of 295,816 af in October (Figure 1), less than the 1997 range of 43,000 af to 410,000 af. A portion of the California Aqueduct was under repair last spring, hence the low pumping rates from February through May. Monthly exports of water at the Central Valley Project (CVP) ranged from 579 af in December to 268,748 af in August.

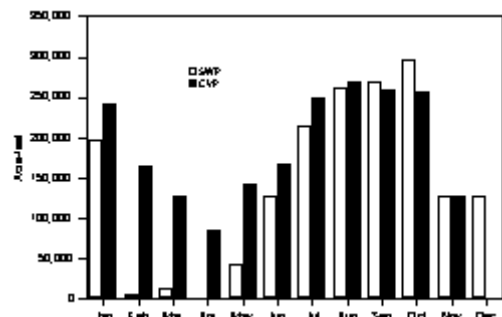


Figure 1 Monthly mean acre-feet of water exported in 1998 by facility

The number of fish salvaged per acre-foot was highest at the SWP in July (5.3) and the CVP in September (8.0) (Figure 2). Chinook salmon salvage was relatively low at the SWP in 1998; the peak salvage was 1,713 fish. At the CVP, salmon salvage was high in January, February, and May: a range of 37,000 to almost 50,000 fish were salvaged in those months (Figure 3). The majority of salmon salvaged in January were fall-run-sized fish, but in May and June, the majority was a mix of fall-run- and spring-run-sized fish. Striped bass salvage peaked in July and August with more than 70,000 striped bass at the SWP and more than 154,000 at the CVP (Figure 4). Young-of-the-year striped bass accounted for the high numbers salvaged at the facilities in July and August. Salvage of American shad peaked twice at the SWP, once in August with more than 101,000 salvaged and again in October (Figure 5). At the CVP, salvage of American shad ranged from zero in April, May, and June to more than 73,000 fish in November. Nearly all American shad salvaged were age-0 fish. Splittail salvage was highest earlier in the year than American shad salvage with almost 1,100,000 salvaged in June and 681,222 in July at the CVP (Figure 6). Splittail salvage at the SWP was less than at the CVP. The highest recorded salvage was 582,518 in July. Few longfin smelt and delta smelt were salvaged at either facility (Figures 7 and 8). Longfin smelt were salvaged in the greatest numbers at the SWP in April (616), while delta smelt salvage was greatest at the CVP in March (584).

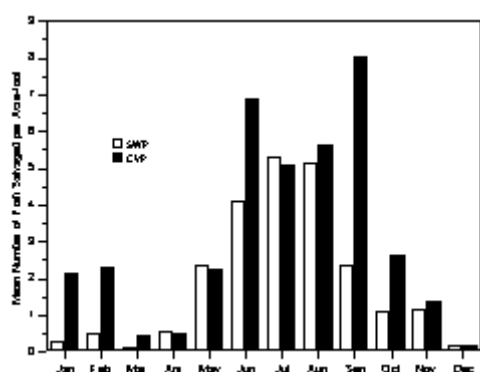


Figure 2 Number of fish salvaged per acre-foot of water exported in 1998

In 1998, splittail salvage at the SWP and CVP was the third highest since 1980, accounting for 25% of total fish salvaged at both facilities (Figures 9 and 10). Chinook salmon, steelhead rainbow trout, delta smelt, and longfin smelt salvage were low compared to previous years. In 1998, salvage of striped bass was the lowest at both facilities since 1983 (Figures 11 and 12). Since 1993, striped bass have been salvaged in low numbers relative to the period 1984 to 1989. Conversely, since 1994, American shad salvage peaked from 1995 to 1997 with a high of 1.5 million salvaged at the SWP and 972,000 salvaged at the CVP in 1996.

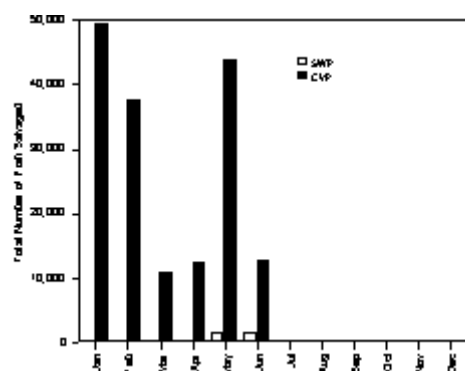


Figure 3 Number of chinook salmon salvaged in 1998 by month and facility

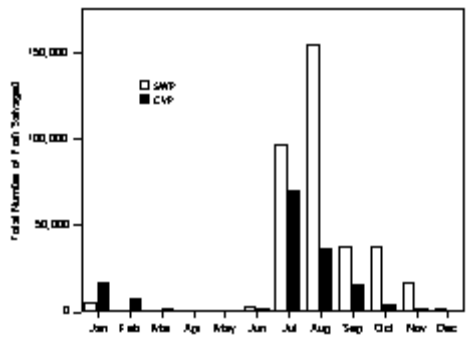


Figure 4 Number of striped bass salvaged in 1998 by month and facility

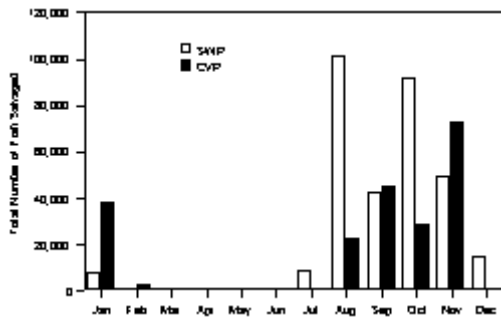


Figure 5 Number of American shad salvaged in 1998 by month and facility

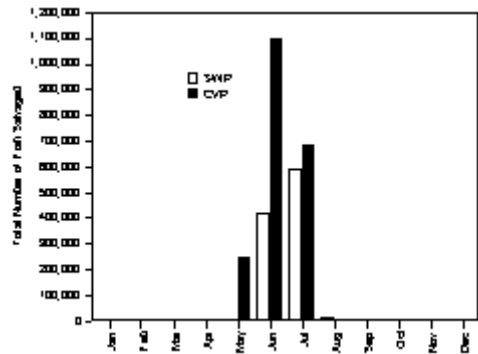


Figure 6 Number of splittail salvaged in 1998 by month and facility

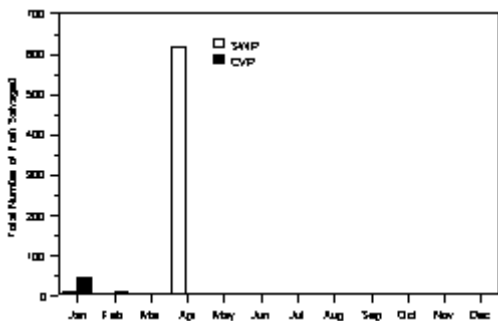


Figure 7 Number of longfin smelt salvaged in 1998 by month and facility

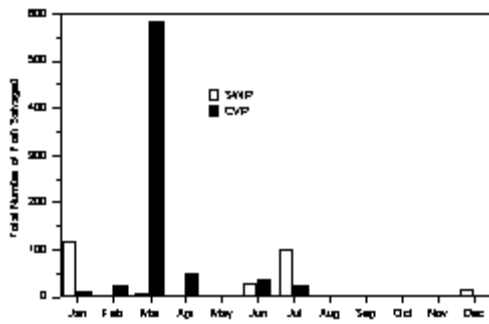


Figure 8 Number of delta smelt salvaged in 1998 by month and facility

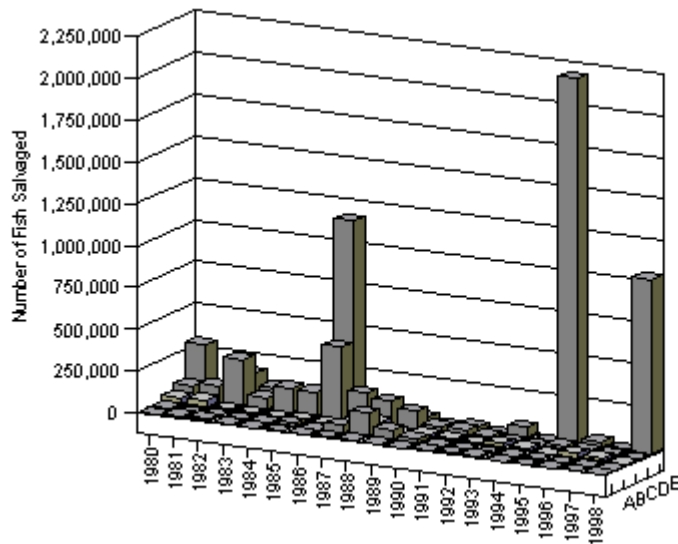


Figure 9 Number of fish of special concern salvaged at the SWP: (A) steelhead; (B) longfin smelt; (C) delta smelt; (D) chinook salmon; and (E) splittail.

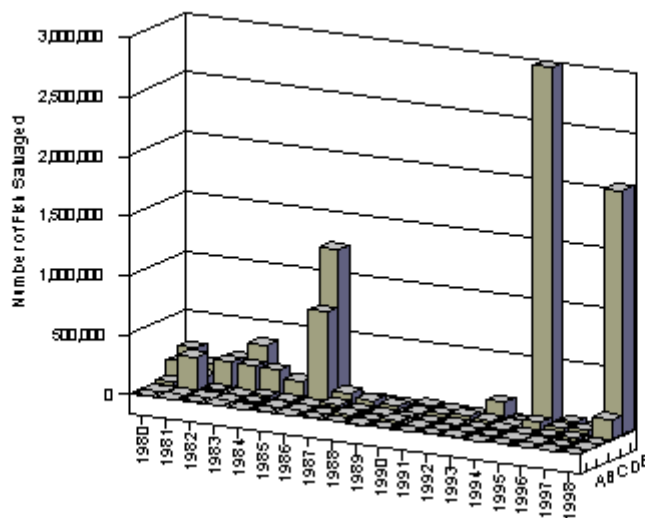


Figure 10 Number of fish of special concern salvaged at the CVP: (A) steelhead; (B) longfin smelt; (C)

delta smelt; (D) chinook salmon; and (E) splittail.

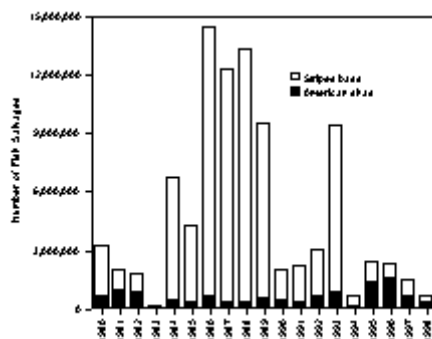


Figure 11 Salvage of American shad and striped bass at the SWP

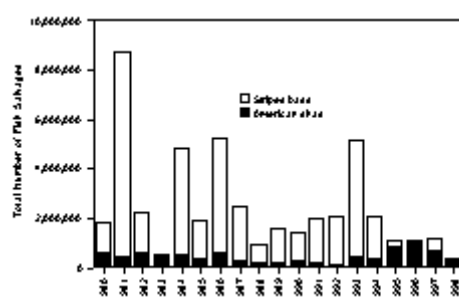


Figure 12 Salvage of American shad and striped bass at the CVP

Estuarine Species Abundance, X2, and Sacramento-San Joaquin Delta Exports

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We updated the relationships between estuarine species abundance and springtime values of X2. X2 is the distance in kilometers from the Golden Gate Bridge to the location where salinity is 2 psu (practical salinity units) one meter above the bottom. We obtained data up to and including 1997 where possible.

The Asian clam (*Potamocorbula amurensis*), first reported in 1986, changed the Suisun Bay, Honker Bay, and western delta ecosystems.

Its populations became so large in some areas, notably Suisun Bay, that standing crops of phytoplankton were decimated and primary production plummeted to about 20 percent of its previous value. In addition to competing directly with zooplankton for what appeared to be limited phytoplankton food resources, the clam impacted zooplankton populations directly by capturing juvenile stages of some species. Because these zooplankton were key food items for the larvae of some fish species, this posed the prospect of a cascading series of indirect negative impacts on the already beleaguered fish populations of the bay. (from Hollibaugh 1996)

This fundamental change means that data from the pre-clam period cannot be combined with data from the post-clam period for the purposes of statistical analysis because there is no a priori reason for assuming that both types of systems respond in an identical fashion to changes in delta outflow.

Therefore, we segregated the data into two sets: pre-Asian clam and post-Asian clam (before 1988 and after 1987,